



Technology Demonstration Summary Sheet

Portable X-Ray Fluorescence Detector - HEPA Filter

THE NEED

Hidden or abraded non-radioactive contaminants such as lead or heavy metals may exist in nuclear facilities undergoing decontamination and decommissioning (D&D). Typical practice is to extract samples for off-site laboratory analysis. This can be a costly and time consuming process. If the contaminant determinations could be made in-situ, the costs and time could be reduced substantially.

THE TECHNOLOGY

The portable Spectrace 9000 unit (TN Spectrace) provides for non-destructive, real-time elemental analysis for solid, liquid, thin film, and powder samples. The system collects x-ray emission spectra from a sample after excitation with one or more radiation sources. The system analyzes elements of atomic number 11 and higher, at concentrations from a few parts per million to percent levels.



Spectrace 9000 Equipment

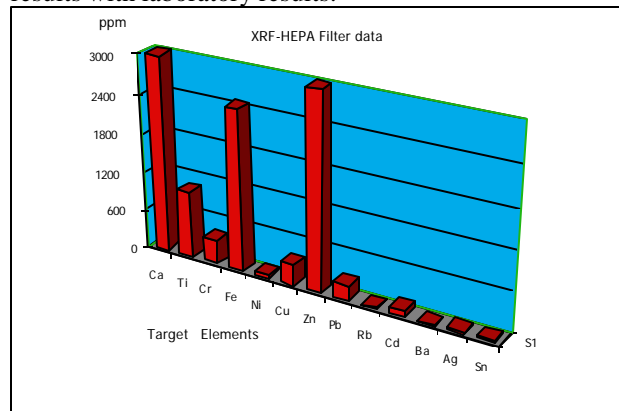
THE DEMONSTRATION

This demonstration, performed in October 1996, tests the applicability of the portable Spectrace 9000 to measure heavy metals in High Efficiency Particulate Air (HEPA) filters for D&D activities from CP-5 reactor area. The demonstration was conducted at the ANL-E Environmental Management Organization (EMO) waste handling area in Building 306 on intact CP-5 HEPA filters removed from service as part of the Large Scale Demonstration Program funded by DOE's Federal Energy Technology Center.

The purposes of this technology demonstration are to: (1) Evaluate the X-ray fluorescence (XRF) technology against baseline technology involving conventional laboratory analysis of HEPA filter media for RCRA metals (2) Demonstrate an alternative operational application of the technique during waste handling operations, (3) Develop characterization data from HEPA filters that have been previously removed from CP-5 area.

THE RESULTS

The XRF identified 13 elements quantitatively. Elevated levels of lead, cadmium and chromium were found in the HEPA filters indicating high levels of RCRA heavy metal contamination during previous D&D activities at CP-5 reactor area. Concentrations of other elements were below levels of concern. The same filters were analyzed according to current analytical procedures, and data comparability will be addressed by comparison of XRF results with laboratory results.



Measurement Results of HEPA Filters from CP-5 Area

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